96M4321o

Single Board Computer

User's Manual

Version 1.0

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How to Use This Manual

The manual describes how to configure your 96M4321o system to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Host Board.

Chapter 1 : System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this series model of single host board.

Chapter 2 : Hardware Configuration. Shows the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. Describes how to properly mount the CPU, main memory to get a safe installation and provides a programming guide of Watch Dog Timer function.

Chapter 4 : BIOS Setup Information. Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5 : Troubleshooting. Provides various useful tips to quickly get 96M4321o running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. **DSM** may make supplement or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : http://www.DSM.AG.

Chapter 1
System Overview

1.1 Introduction

PICMG organization published PICMG 1.3 specification in late year 2005 which adopts PCI Express as external I/O expansion interface. The advanced PCI Express Technology's throughput balanced the modern extreme computing power that makes the system much more powerful.

96M4321o, the PICMG 1.3 SHB (Single Host Board) supports Intel® Core 2 Duo processor that based on Intel® innovated Core Microarchitecture. The attractive processor does not only posses amazing parallel computing power but also generates 65W TDP (Thermal Design Power). That makes the system more powerful and reliable with dual-core processor with smaller and quieter cooling fan.

The SHB was empowered by Intel® Q965 & ICH8DO chipset. The Q965 embedded Graphics Media Adapter 3000 is the 4th generation Intel integrated graphics controller that supports DirectX 9.0, Shader model 2.0, 256MB of video memory. More than that, user could utilize even higher-end, the latest PCI Express x16 interface graphics card via backplane.

To meet bandwidth of storage and expansion cards requirement, the 96M4321o was designed flexible with four PCI Express lanes via backplane. Those four PCI Express lanes could be four PCI Express x1 links or one PCI Express x4 link. Four PCI Express x1 links configuration can support more PCI Express x1 devices via backplane and one PCI Express x4 link configuration can support RAID card or special add-on cards such as image processing board. In addition, the flexible configuration can be leveraged with bridge on backplane to support more PCI or PCI-X slots that benefits industries with legacy support.

Advanced Management Technology (AMT) is feature that 96M4321o equipped. This technology provides remote access capability via Intel® Gigabit Ethernet controller. With software from 3rd party, the new technology allows MIS or user to monitor system status and help the client to recover failure system. Beside that, the hardware and software information can be gathering by 3rd party software then storage in SPI interface EEPROM. Therefore, asset management could be done at the same time.

96M4321o features:

- Support Intel® Core 2 Duo, Pentium® D, Pentium® 4, Celeron® D processor in an LGA775 socket that equipped with dual core, Hyper-Threading, EM64T, EIST, XD & VT technologies
- Dual 240-pin DDR2 SDRAM DIMM socket, support for DDR2 800/667/533 DIMMs, up to 4GB system memory
- Intel® Q965 integrated GMA 3000 on-board graphics delivers richer visual color and picture clarity
- Equipped dual Gigabit Ethernet ports
- One PCI Express x16 external expansion fulfills visual
- Configurable four external PCI Express lanes (one x4 or four x1)

The PICMG 1.3 SHB is the best solution of applications such like flight simulation, image processing, broadcasting and so on that need performance of display and storage.

1.2 Check List

The 96M4321o package should cover the following basic items:

- ✓ One 96M4321o single host board
- ✓ One dual Serial ports cable kit
- ✓ One single Parallel port cable kit
- ✓ One FDD cable
- ✓ Two 7-pin SATA signal cables
- ✓ One Installation Resources CD-Title
- ✓ One booklet of 96M4321o

Optional: One bracket with PS/2 keyboard and mouse

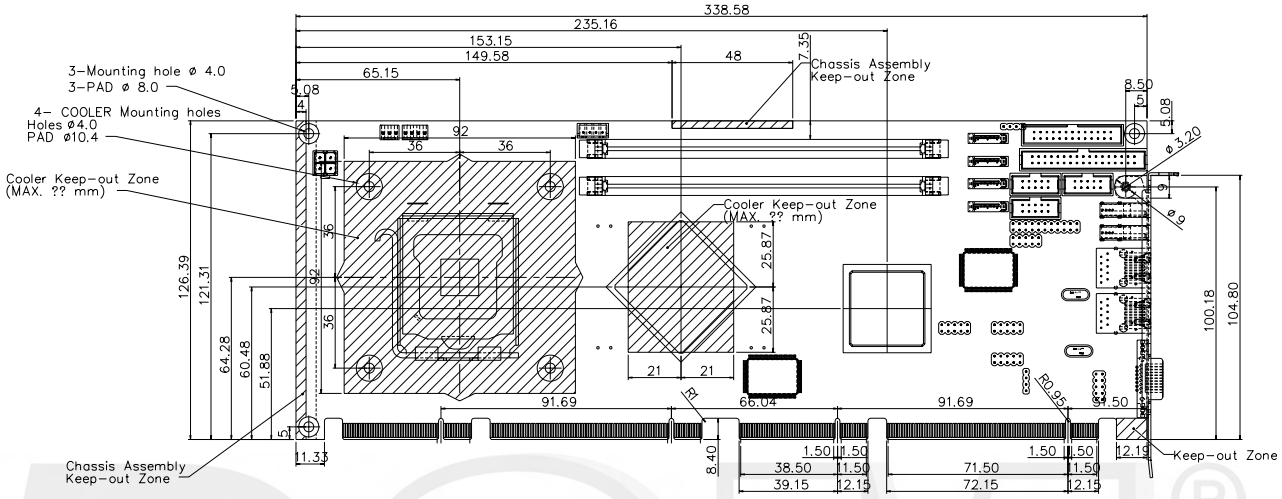
If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1.3 Product Specification

- **Main processor**
  - Intel® Core 2 Duo/Pentium D/Pentium® 4/Celeron D Processor
  - FSB: 1,066/800/533MHz
- **BIOS**
  Phoenix (Award) system BIOS with 4Mb Flash ROM with easy upgrade function ACPI, DMI, Green function and Plug and Play Compatible
- **Main Memory**
  - Support dual channel DDR2 memory interface
  - Non-ECC, non-buffered DIMMs only
  - Two DIMM sockets support 800/667/533 DDR2-SDRAM up to 4GB System Memory
- **L2 Cache Memory**
  Built-in Processor
- **Chipset**
  Intel® Q965 GMCH and ICH8DO chipset
- **Bus Interface**
  - Follow PICMG 1.3 Rev 1.0 standard (PCI Express and PCI)
  - Support four PCI Express x1 (can be aggregated as one PCI Express x4) through backplane
  - Support four PCI devices through backplane
- **SATA**
  - Four SATA 300 ports on-board and dual SATA 300 ports via backplane
  - Support Intel® Matrix Storage Technology based on Intel® ICH8DO
- **Floppy Drive Interface**
  Support one FDD port up to two floppy drives and 5-1/4"(360K, 1.2MB), 3-1/2" (720K, 1.2MB, 1.44MB, 2.88MB) diskette format and 3-mode FDD
- **Serial Ports**
  Support two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs
- **Parallel Port**
  Support one parallel port with SPP, EPP and ECP modes
- **USB Interface**
  Support eight USB (Universal Serial Bus) ports (dual USB ports on bracket that dedicated to keyboard & mouse; four USB ports on-board and dual USB ports via backplane) for high-speed I/O peripheral devices
- **PS/2 Mouse and Keyboard Interface**
  Support one 10-pin connector for external PS/2 keyboard/mouse connection
- **Auxiliary I/O Interfaces**
  System reset switch, external speaker, Keyboard lock and HDD active LED, etc

- **Real Time Clock/Calendar (RTC)**
  Support Y2K Real Time Clock/Calendar with battery backup for 7-year data retention
- **Watchdog Timer**
  - Support WDT function through software programming for enable/disable and interval setting
  - Generate system reset
- **On-board VGA**
  GMCH integrated graphics, 400MHz core frequency; share system memory up to 64MB for system with greater than or equal to 192MB of system memory
- **On-board Ethernet LAN**
  Dual Intel® PCI Express x1 interface based Gigabit Ethernet to support RJ-45 connector
- **High Driving GPIO**
  Support 8 programmable high driving GPIO
- **Cooling Fans**
  Support one 4-pin power connector for CPU fan and one 3-pin power connector for system fan
- **System Monitoring Feature**
  Monitor CPU temperature, system temperature and major power sources, etc.
- **Bracket**
  Support dual Ethernet port with 2 indicators, dual USB ports and one CRT port
- **Outline Dimension (L X W):**
  338.5mm (13.33") X 122mm (4.8")
- **Power Requirements:**
  - +12V@ 3.4A
  - +5V @ 4.5A
  - Test configuration:
    - CPU: Intel® Core 2 Duo 2.13GHz(FSB: 1,066 / L2 cache: 2MB)
    - Memory: Transcend (SAMSUNG-K4T51083QC-ZCE7) 512GBx2 DDRII 800
    - Primary Master SATA HDD: HITACHI-HDS721680PLA380 (82GB)
    - OS: Microsoft Windows XP Professional + SP2
    - Test Programs: Burning Test V5.0
    - Run Time: Full loading
- **Operating Temperature:**
  0°C ~ 60°C (23°F ~ 140°F)
- **Storage Temperature:**
  -20°C ~ 80°C
- **Relative Humidity:**
  5% ~ 90%, non-condensing

1.3.1 Mechanical Drawing



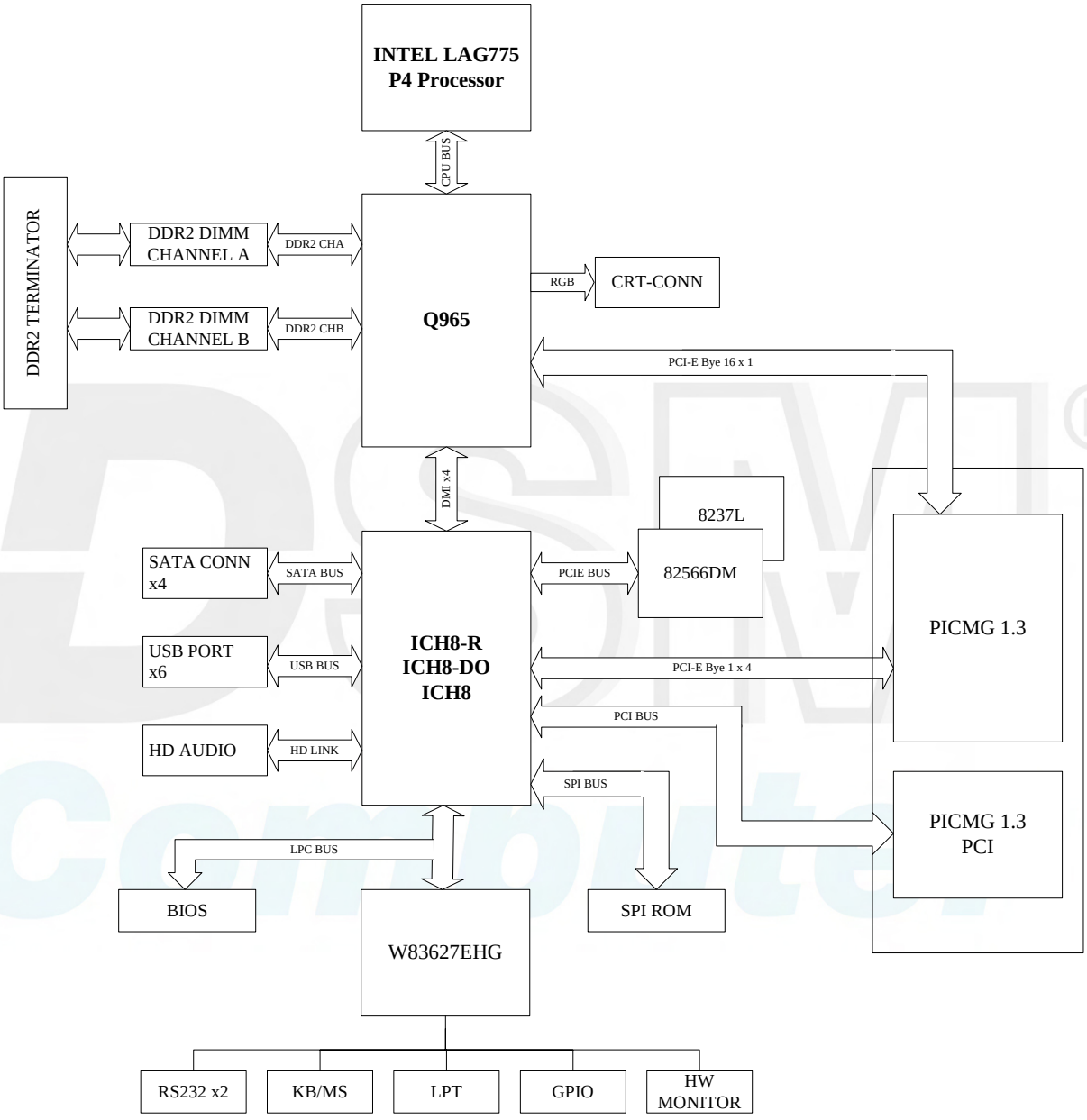
1.4 System Architecture

96M4321o adopts Intel® Q965 Express chipset that supports Intel® Core 2 Duo processor that based on Intel innovative Core Mircoarchitecture Technology. Q965 GMCH (Graphics Memory Controller Hub) embedded Graphics Media Accelerator 3000 (GMA 3000) and features PCI Express x16 graphics interface via backplane that supports the latest high-performance graphics cards. Along with the highest 1,066MHz FSB of processor, the parallel system memory up to DDR2 800 as well.

The companion I/O controller, ICH8DO has six PCI Express x1 links that throughput is 2.5Gbps per direction. And they were designed as interface of dual Gigabit Ethernet ports on-board and four PCI Express x1 expansion via backplane. One special characteristic of the ICH8DO is the capability to aggregate these four PCI Express x1 link as on PCI Express x4 link. And that is what user can benefit for PCI Express x4, high throughput storage expansion card via backplane.

ICH8DO provides six SATA 300 ports, together with Intel® Matrix Storage Technology (MST), the 96M4321o offers cost effective RAID 0, 1, 5 and 10 that seamlessly protects against data loss from hard drive failure. Dual SATA ports and dual USB ports are routed to gold finger for better wiring consideration of these two kinds of interface via backplane.

Super I/O chip, W83627 is responsible for PS/2 keyboard/mouse, UARTs, FDC, hardware monitor, Parallel, and Watch Dog Timer interface.



96M4321o System Block Diagram

Chapter 2
Hardware Configuration

This chapter gives the definitions and shows the positions of jumpers, headers and connector. All of the configuration jumpers on 96M4321o series are in the proper position. The default settings shipped from factory are marked with a star (★).

2.1 Jumper Setting

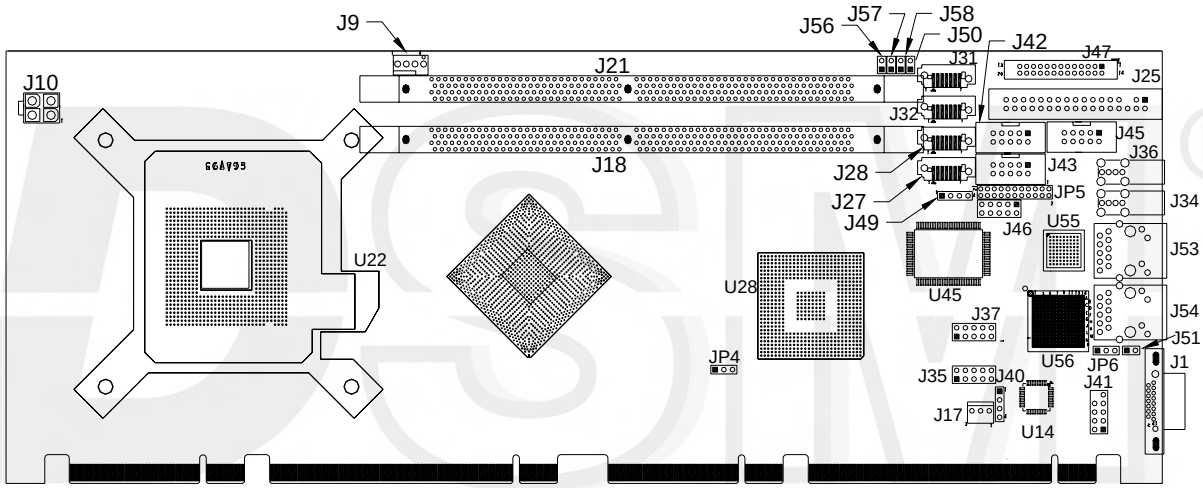


Figure 2-1 96M4321o Jumper Location

JP4: CMOS Clear

JP4	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS Contents

JP5: COM2 (J43) Interface Selection

JP5	Function
5-6, 9-11, 10-12, 15-17, 16-18 Short	RS-232 ★
3-4, 7-9, 8-10, 13-15, 14-16, 21-22 Short	RS-422
1-2, 7-9, 8-10, 19-20 Short	RS-485

JP6: Intel 82573L Interface Selection

Reserve for Enable or disable LAN function.
Normal control at 1-2 short.

J56/J57: PCI-E X1,X4 Interface Selection

J56,J57	Function
Short	PCI-E X4 (Support one slot)
Open	PCI-E X1 (Support four slot) ★

2.2 Connector Allocation

I/O peripheral devices are connected to the interface connectors on this Single Board Computer.

Connector Function List

Connector	Description	Remark
J1	VGA D-SUB Connector	
J9	FAN 1 (CPU FAN) Power Connector	
J10	+12V Power Connector	
J17	FAN 2 (SYSTEN FAN) Power Connector	
J18	DDR2 SDRAM SLOT	
J21	DDR2 SDRAM SLOT	
J25	Floppy Connector	
J27	SATA 3 Connector	
J28	SATA 2 Connector	
J31	SATA 0 Connector	
J32	SATA 1 Connector	
J34	External USB Connector	
J35	Internal USB Connector	
J36	External USB Connector	
J37	Internal USB Connector	
J40	Audio CD -IN Connector	
J41	Audio Connector	
J42	COM1 Serial Port 1 Connector	
J43	COM2 Serial Port 2 Connector	
J45	External PS/2 Keyboard/Mouse Connector	
J46	General Purpose I/O Connector	
J47	Parallel Port Connector	
J49	External Speaker Connector	

J50	Suspend LED	
J51	SATA LED	
J53	Ethernet RJ-45 Connector (LAN 1)	
J54	Ethernet RJ-45 Connector (LAN 2)	
J55	Reserve	
J58	Power LED	

Pin Assignments of Connectors

J1: On-board VGA Connector

PIN No.	Signal Description
1	Red
2	Green
3	Blue
4	Monitor ID0 (MONID0) (5V I/F)
5	Ground
6	Ground
7	Ground
8	Ground
9	+5V
10	Ground
11	Monitor ID1 (MONID1) (5V I/F)
12	VGA DDC Data (5V I/F)
13	Horizontal Sync. (HSYNC) (5V I/F)
14	Vertical Sync. (VSYNC) (5V I/F)
15	VGA DDC Clock (5V I/F)

J9: CPU Fan Connector

PIN No.	Signal Description
1	Ground
2	+12V
3	Fan Control
4	Fan Speed Detecting signal

J10: +12V POWER Connector

PIN No.	Signal Description
1	Ground
2	Ground
3	+12V
4	+12V

J17: System Fan Connector

PIN No.	Signal Description
1	Ground
2	+12V
3	Fan Speed Detecting signal

J25: FDC Interface Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	Density Select 0
3	Ground	4	N/C
5	Ground	6	Density Select 1
7	Ground	8	Index#
9	Ground	10	Motor ENA#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor ENB#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	Ground	30	Read Data#
31	Ground	32	Head Select#
33	Ground	34	Disk Change#

J31/J32/J28/J27: Primary/Secondary/3rd/4th SATA Connector

PIN No.	Signal Description
1	Ground
2	SATATX+ (SATATXP)
3	SATATX- (SATATXN)
4	Ground
5	SATARX- (SATARXN)
6	SATARX+ (SATARXP)
7	Ground

J34/J36: External USB Connector

PIN No.	Signal Description
1	5V Dual
2	USB0-
3	USB0+
4	Ground

J35/J37: Internal USB Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Ground	2	5V Dual
3	Ground	4	USB3-
5	USB2+	6	USB3+
7	USB2-	8	Ground
9	5V Dual	10	Ground

Note:
5V Dual is always available. It's supplied by either 5V VCC power source in normal operation mode or 5V standby power source in standby mode.

J40: Audio CD-IN Connector

PIN No.	Signal Description
1	CD-in Left Channel
2	CD Ground
3	CD Ground
4	CD-in Right Channel

J41: Audio MIC/Line-in/Line-out Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	MIC with Reference Voltage	2	Analog Ground
3	Line-in Left Channel	4	Analog Ground
5	Line-in Right Channel	6	Analog Ground
7	Line-out Left Channel	8	Analog Ground
9	Line-out Right Channel	10	N/C

J42: COM1 Serial Port 1 Connector

PIN No.	Signal Description
1	DCD (Data Carrier Detect)
2	RXD (Receive Data)
3	TXD (Transmit Data)
4	DTR (Data Terminal Ready)
5	GND (Ground)
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)
10	N/C

J43 : COM2 Serial Port 2 Connector

PIN No.	Signal Description		
	RS-232	RS-422	RS-485
1	DCD (Data Carrier Detect)	TX-	DATA-
2	RXD (Receive Data)	TX+	DATA+
3	TXD (Transmit Data)	RX+	N/C
4	DTR (Data Terminal Ready)	RX-	N/C
5	GND (Ground)	GND	GND
6	DSR (Data Set Ready)	N/C	N/C
7	RTS (Request to Send)	N/C	N/C
8	CTS (Clear to Send)	N/C	N/C
9	RI (Ring Indicator)	N/C	N/C
10	N/C	N/C	N/C

Note:
J43 (COM2) could be configurable as RS-232/422/485 with jumper JP5.

J45: External PS/2 Keyboard/Mouse Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Mouse Data	2	Keyboard Data
3	N/C	4	N/C
5	Ground	6	Ground
7	PS2 Power	8	PS2 Power
9	Mouse Clock	10	Mouse Clock

J46: General Purpose I/O Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO0	2	GPIO4
3	GPIO1	4	GPIO5
5	GPIO2	6	GPIO6
7	GPIO3	8	GPIO7
9	Ground	10	+5V

Note:
All General Purpose I/O ports can only apply to standard TTL ± 5% signal level (0V/5V), and each Fan.

J47: Parallel Port Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	Strobe#	14	Auto Form Feed#
2	Data 0	15	Error#
3	Data 1	16	Initialization#
4	Data 2	17	Printer Select IN#
5	Data 3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	Acknowledge#	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	N/C

J49: External Speaker Connector

PIN No.	Signal Description
1	Speaker Signal Output (Open-drain w/ internal series 33 Ohm)
2	N/C
3	Ground
4	+5V

Note:
The pull-high voltage of external speaker is limited at 5V maximum.

J50: Suspend LED Connector

PIN No.	Signal Description
1	Ground
2	5V_DUAL

J51: Suspend LED Connector

PIN No.	Signal Description
1	SATA LED Signal
2	3.3V

J53/J54 : Ethernet RJ-45 Connector

PIN No.	Signal Description
1	MDI0+ (MDI0P)
2	MDI0- (MDI0N)
3	MDI1+ (MDI1P)
4	MDI2+ (MDI2P)
5	MDI2- (MDI2N)
6	MDI1- (MDI1N)
7	MDI3+ (MDI3P)
8	MDI3- (MDI3N)

J58: Power LED Connector

PIN No.	Signal Description
1	Ground
2	3.3V

Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you handle WDT and GPIO operation in software programming.

3.1 Intel® LGA775 Processor

Installing LGA775 CPU

1) Lift the handling lever of CPU socket outwards and upwards to the other end. Following step A position to step B position.

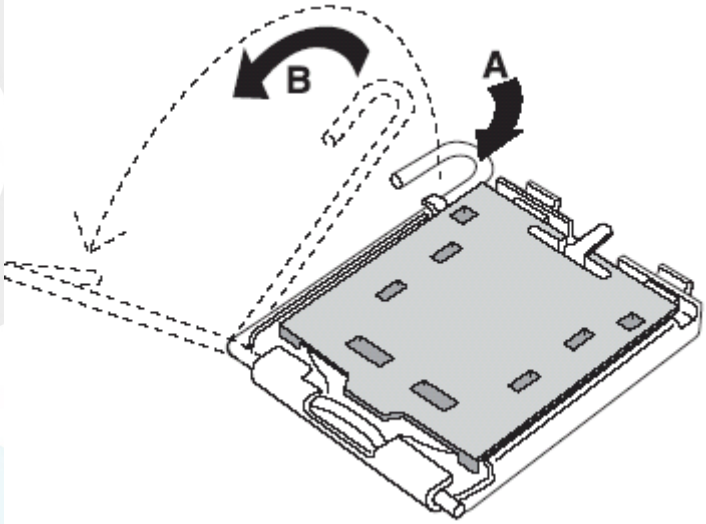


Figure 3-1

2) Aligning the processor's pins with pinholes on the socket, and then make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into correct place. If this operation is not easy or smooth, don't do it forcibly. You need to check and rebuild the CPU pin uniformly.

Triangle mark is meaning first pin position; kindly assemble and take aim at notch of top and bottom between CPU and socket.

Figure 3-2

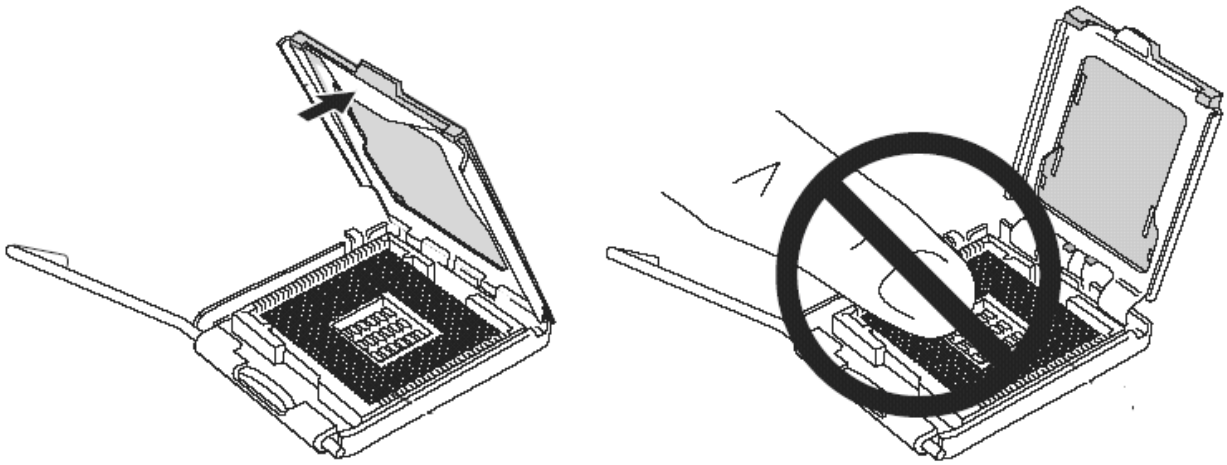


Figure 3-3

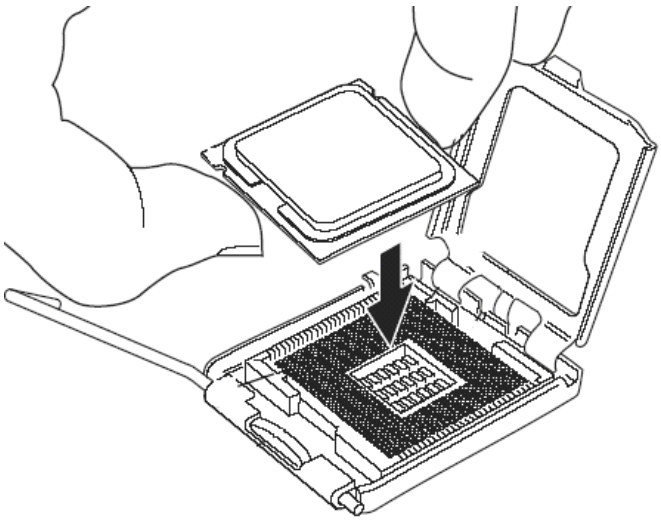


Figure 3-4

Precaution! (See fig.3-3 and fig.3-4) Don't touch directly by your hand or impacts internal align balls of CPU socket to avoid motherboard destruction, it is a precise actuator.

3) Push down the lever to lock processor chip into the socket once CPU fits.

4) Follow the installation guide of cooling fan or heat sink to mount it on CPU surface and lock it on the LGA775.

Removing CPU

1) Unlock the cooling fan first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lifts up the existing CPU to remove it from the socket.
4) Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

Configuring System Bus

96M4321o will automatically detect the CPU used. All of CPU speed of Intel® Pentium® D, Pentium® 4 and Celeron D can be detected automatically.

3.2 Main Memory

96M4321o provides two DDR2-SDRAM DIMM sockets to support dual-channel & single channel DDR2 memory interface. The maximum memory size can be up to 4 GB, memory frequency includes 800/667/533. Auto detects memory clock, which is according to BIOS CMOS settings.

For system compatibility and stability, do not use memory module without brand. Memory configuration can be either one double-sided DIMM in either one DIMM socket or two single-sided DIMM in both sockets.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

Dual Channel DDR2 DIMMs

Dual Channel DDR2 memory technology doubles the bandwidth of memory bus. Adequate or higher bandwidth of memory than processor would increase system performance. To enable Dual Channel DDR2 memory technology, install two identical memory modules in both memory sockets is required. Following tables show bandwidth information of different processor and memory configurations.

CPU FSB	Bandwidth
1066MHz	8.5 GB/s
800MHz	6.4GB/s
533MHz	4.2GB/s

Memory Frequency	Dual Channel DDR2 Bandwidth	Single Channel DDR2 Bandwidth
800MHz	25.6 GB/s	12.8 GB/s
667MHz	21.2 GB/s	10.6 GB/s
533MHz	16.8 GB/s	8.4 GB/s

Note:
To maintain system stability, don't change any of DRAM parameters in BIOS setup to upgrade system performance without acquiring technical information.

Memory frequency / CPU FSB synchronization

96M4321o series support different memory frequencies depending on the CPU front side bus and the type of DDR2 DIMM.

CPU FSB	Memory Frequency
1066MHz	800/667/533MHz
800MHz	667/533MHz
533MHz	533MHz

3.3 Installing the Single Board Computer

To install your 96M4321o into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position
Step 2 : Install and configure CPU and memory module on right position
Step 3 : Place 96M4321o into the dedicated position in the system
Step 4 : Attach cables to existing peripheral devices and secure it

WARNING
Please ensure that SBC is properly inserted and fixed by mechanism. Otherwise, the system might be unstable or do not work due to bad contact of PICMG 1.3 PCI plus.

Note:
Please refer since section 3.3.1 to 3.3.4 to install INF/VGA/LAN/Audio drivers.

3.3.1 Chipset Component Driver

The chipset used on 96M4321o series is relatively new which operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows 2000/XP, please install its INF before any of other Drivers are installed.

3.3.2 Intel® Integrated Graphics GMCH Chip

Using GMCH 3000 High performance graphic integrated chipset is aimed to gain an outstanding graphic performance. It is accompanied by shared up to 256MB system memory with Intel® DVMT; 400MHz core frequency. This combination makes 96M4321o an excellent piece of multimedia hardware.

With no additional video adaptor, this onboard video will usually be the system display output. By adjusting the BIOS setting to disable on-board VGA, an add-on PCI VGA card can take over the system display.

Drivers Support

Please find Q965 driver in the 96M4321o CD-title. Drivers support Windows 2000 and Windows XP.

3.3.3 Gigabit Ethernet Controller

Drivers Support

Please find LAN driver in /Ethernet directory of 96M4321o CD-title. The driver supports Windows-XP and Windows 2000.

LED Indicator (for LAN status)

96M4321o provides two LED indicators to report Intel 82573L and 82560M Gigabit Ethernet interface status. Please refer to the table below as a quick reference guide.

<table>
<tr><th rowspan="2">82573L
82560M</th><th rowspan="2">Color</th><th rowspan="2">Name of LED</th><th colspan="3">Operation of Ethernet Port</th></tr>
<tr><th colspan="2">ON</th><th>OFF</th></tr>
<tr><td>Status LED</td><td>Green</td><td>LAN Linked & Active LED</td><td colspan="2">Linked</td><td>Active (Blinking)</td></tr>
<tr><td rowspan="2">Speed LED</td><td>Orange</td><td rowspan="2">LAN speed LED</td><td>Giga Mbps</td><td>100 Mbps</td><td>10 Mbps</td></tr>
<tr><td>Green</td><td>Orange</td><td>Green</td><td>Off</td></tr>
</table>

3.3.4 On-board Realtek ALC262 Device

The Audio codec device provides a more than standard sound display. It is capable for many general purposes. Realtek ALC262 based on HDA (High Definition Audio) to provide 2-channel audio function such as Line-in/Line-out/MIC via header on-board.

Driver Support

Please find Sound driver in \Audio of 96M4321o driver CD-title. The drivers support Windows 2000 and Windows XP.

3.4 Clear CMOS Operation

The following table indicates how to enable/disable CMOS Clear Function hardware circuit by putting jumpers at proper position.

JP4	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS contents

To correctly operate CMOS Clear function, users must turn off the system, move JP4 jumper to short pin 2 and 3. To clear CMOS contents, please turn the power back on and turn it off again for AT system, or press the toggle switch a few times for ATX system. Move the JP4 back to 1-2 position (Normal Operation) and start the system. System will then produce a "CMOS Check Sum Error" message and hold up. Users may then follow the displayed message to load BIOS default setting.

3.5 WDT Function

The working algorithm of the WDT function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from boards to boards.

96M4321o allows users control WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset or to non-maskable interrupt (NMI), when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action will restart the counting process. A well-written WDT program should keep the counting process running under normal condition. WDT should never generate a system reset or NMI signal unless the system runs into troubles.

The related Control Registers of WDT are all included in the following sample program that is written in C language. User can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or user can directly fill a zero value into Time-out Value Register to disable WDT immediately. To ensure a successful accessing to the content of desired Control Register, the sequence of following program codes should be step-by-step run again when each register is accessed.

Additionally, there are maximum 2 seconds of counting tolerance that should be considered into user' application program. For more information about WDT, please refer to Winbond W83627EHG data sheet.

There are two PNP I/O port DDR2 that can be used to configure WDT,
1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

Below are some example codes, which demonstrate the use of WDT.

```
// Enter Extended Function Mode
outp(0x002E, 0x87);
outp(0x002E, 0x87);
// Assign Pin 77 to be a WDTO, 0 write to    CR2D:Bit0
outp(0x002E, 0x2D);
outp(0x002F, inp(0x002F) & 0xEF);
// Select Logic Device 8
outp(0x002E, 0x07);
outp(0x002F, 0x08);
// Active Logic Device 8
outp(0x002E, 0x30);
outp(0x002F, 0x01);
```

```
// Select Count Mode
outp(0x002E, 0xF5);
outp(0x002F, (inp(0x002F) & 0xF7) | ( Count-mode Register  & 0x08));
// Specify Time-out Value
outp(0x002E, 0xF6);
outp(0x002F,  Time-out Value Register );
// Disable WDT reset by keyboard/mouse interrupts
outp(0x002E, 0xF7);
outp(0x002F, 0x00);
// Exit Extended Function Mode
outp(0x002E, 0xAA);
```

Definitions of Variables:

Value of Count-mode Register:
1) 0x00 -- Count down in seconds (Bit3=0)
2) 0x08 -- Count down in minutes (Bit3=1)
Value of Time-out Value Register:
1) 0x00 -- Time-out Disable
2) 0x01~0xFF -- Value for counting down

3.6 SMBus

The System Management Bus is a two-wire interface through which simple power-related chips can communicate with rest of the system. It uses I2C as its backbone.

A system using SMBus passes messages to and from devices instead of tripping individual control lines. With the SMBus, a device can provide manufacturer information, tell the system what its model/part number is, save its state for a suspend event, report different types of errors, accept control parameters, and return its status.

The SMBus may share the same host device and physical bus as ACCESS bus components provided that an appropriate electrical bridge is provided between the interval SMB devices and external ACCESS bus devices.

3.7 On-Board USB 2.0 Controller

Drivers Support

Please find Intel® ICH8R USB driver in /USB20 directory of 96M4321o CD-title. The drivers support Windows-2000/XP.

3.8 GPIO

The 96M4321o provides 8 programmable input or output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O Selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.

3.8.1 Pin assignment

J46: General Purpose I/O Connector

PIN No.	Signal Description
1	General Purpose I/O Port 1 (GPIO10)
2	General Purpose I/O Port 1 (GPIO14)
3	General Purpose I/O Port 1 (GPIO11)
4	General Purpose I/O Port 1 (GPIO15)
5	General Purpose I/O Port 1 (GPIO12)
6	General Purpose I/O Port 1 (GPIO16)
7	General Purpose I/O Port 1 (GPIO13)
8	General Purpose I/O Port 1 (GPIO17)
9	Ground
10	+5V

All General Purpose I/O ports can only apply to standard TTL ± 5% signal level (0V/5V), and each source sink capacity up to 12mA.

3.8.2 96M4321o GPIO Programming Guide

There are 8 GPIO pins on 96M4321o series. These GPIO pins are from SUPER I/O (W83627EHG) GPIO pins, and can be programmed as Input or Output direction.

J46 pin header is for 8 GPIO pins and its pin assignment as following :

J46_Pin1=GPIO1:from SUPER I/O_GPIO 10 with Ext. 4.7K PH
J46_Pin2=GPIO2:from SUPER I/O_GPIO 14 with Ext. 4.7K PH
J46_Pin3=GPIO3:from SUPER I/O_GPIO 11 with Ext. 4.7K PH
J46_Pin4=GPIO4:from SUPER I/O_GPIO 15 with Ext. 4.7K PH
J46_Pin6=GPIO5:from SUPER I/O_GPIO 12 with Ext. 4.7K PH
J46_Pin7=GPIO6:from SUPER I/O_GPIO 16 with Ext. 4.7K PH
J46_Pin8=GPIO7:from SUPER I/O_GPIO 13 with Ext. 4.7K PH
J46_Pin9=GPIO8:from SUPER I/O_GPIO17 with Ext. 4.7K PH

<<<<< Be careful Pin9=GND , Pin10=VCC >>>>>

There are several Configuration Registers (CR) of W83627EHG needed to be programmed to control the GPIO direction, and status (GPI)/value (GPO). CR00h ~ CR2F are common (global) registers to all Logical Devices (LD) in W83627EHG. CR07h contains the Logical Device Number that can be changed to access the LD as needed. LD7 contains the GPIO10~17 registers.

Programming Guide:
Step1: LD7_CR07h.P [07h]; Point to LD7
Step2: LD7_CR30h_Bit0.P1; Enable LD7
Step3: CR F3h_Bit [7.0]. P [1,1,1,1,1,1,1]; to select multiplexed pins as GPIO10~17 pins
Step4: Select GPIO direction, Get Status or output value.

LD7_CRF0h; GPIO17 ~ 10 direction, 1 = input, 0 = output pin
LD7_CRF2h.P [00h]; Let CRF1 (GPIO data port) non-invert to prevent from confusion
LD7_CRF1h; GPIO17~10 data port, for input pin, get status from the related bit, for output pin, write value to the related bit.

For example,

LD7_CRF0h_Bit4.P0; Let GPIO14 as output pin
LD7_CRF2h_Bit4.P0; Let CRF1_Bit4 non-inverted
LD7_CRF1h_Bit4.P0; Output "0" to GPIO14 pin (J46_Pin2)
LD7_CRF0h_Bit0.P1; Let GPIO10 as input pin
LD7_CRF2h_Bit0.P0; Let CRF1_Bit0 non-inverted
Read LD7_CRF1h_Bit0; Read the status from GPIO10 pin (J46_Pin1)

How to access W83627EHG CR?

In 96M4321o, the EFER = 002Eh, and EFDR = 002Fh.
EFER and EFDR are 2 IO ports needed to access W83627EHG CR.
EFER is the Index Port, EFDR is the Data Port.
CR index number needs to be written into EFER first,
Then the data will be read/written from/to EFDR.

To R/W W83627EHG CR, it is needed to Enter/Enable Configuration Mode first. When completing the programming, it is suggested to Exit/Disable Configuration Mode.

Enter Configuration Mode: Write 87h to IO port EFER twice.
Exit Configuration Mode: Write AAh to IO port EFER.

3.8.3 Example

The example of program for GPIO test as following is based on J46 1-2, 3-4, 5-6,7-8 short.

```
#include <stdio.h>
#include <conio.h>
#include <dos.h>

#define Superio_Addr        0x2e
/* #define DEBUG                        1 */

void enter_Superio_CFG(void)
{
      outportb(Superio_Addr, 0x87);
      outportb(Superio_Addr, 0x87);
}

void exit_Superio_CFG(void)
{
      outportb(Superio_Addr, 0xAA);
}

void Set_CFG(unsigned char Addr,unsigned char Value)
{
   unsigned char d;
      outportb(Superio_Addr, Addr);
      delay(2);
      outportb(Superio_Addr +1, Value);
#ifdef DEBUG
      d = inportb(Superio_Addr+1);
      printf("\nWrite %x to CR%x, read back is:%x",Value,Addr,d);
#endif /*DEBUG*/
      delay(2);
}
```

```
unsigned char Get_CFG(unsigned char Addr)
{
   unsigned char d;
      outportb(Superio_Addr, Addr);
      delay(2);
      d = inportb(Superio_Addr+1);
#ifdef DEBUG
      printf("\nGet data %x from CR%x",d,Addr);
#endif /*DEBUG*/
      delay(2);
      return(d);
}

int main(void)
{
      unsigned char d;

      printf("\nROBO-8717 GPIO TEST Program R1.0");
      enter_Superio_CFG();
      /* CR29 B0 = 0 selet GPIO Port 1*/
      d = Get_CFG(0x29);
      d = d | 0x01;
      Set_CFG(0x29, d);
      /* IO test loop 1 */
      /* Set GPIO Port 1 Enable */
      Set_CFG(0x07, 0x07);     /* Select logic device 07*/
      Set_CFG(0x30, 0x01);     /* Enable GPIO Port 1 */
      Set_CFG(0xF2, 0x00);
      Set_CFG(0xF3, 0x00);
      Set_CFG(0xF0, 0xF0);     /* GPIO Port 1 B7-4 is input, B3-0 is output */

      Set_CFG(0x07, 0x07);     /* Select logic device 07*/
      Set_CFG(0xF1, 0x0e);     /* GP10 -> ~GP14 */
      d = Get_CFG(0xF1);                  /* get GPIO Port 1 data */
      d = d & 0xF0;
      if (d != 0xe0 )
      {
         printf("\nGP10 -> GP14 test fail !!!\n\n");
         Set_CFG(0xF0, 0xff);  /* GPIO Port 1 is input */
         exit(1);
      }
```

```
Set_CFG(0x07, 0x07);     /* Select logic device 07*/
Set_CFG(0xF1, 0x0d);     /* GP11 -> ~GP15 */
d = Get_CFG(0xF1);                    /* get GPIO Port 1 data */
d = d & 0xF0;
if (d != 0xd0 )
{
   printf("\nGP11 -> GP15 test fail !!!\n\n");
   Set_CFG(0xF0, 0xff);  /* GPIO Port 1 is input */
   exit(1);
}
Set_CFG(0x07, 0x07);     /* Select logic device 07*/
Set_CFG(0xF1, 0x0b);     /* GP12 -> ~GP16 */
d = Get_CFG(0xF1);                    /* get GPIO Port 1 data */
d = d & 0xF0;
if (d != 0xb0 )
{
   printf("\nGP12 -> GP16 test fail !!!\n\n");
   Set_CFG(0xF0, 0xff);  /* GPIO Port 1 is input */
   exit(1);
}
Set_CFG(0x07, 0x07);     /* Select logic device 07*/
Set_CFG(0xF1, 0x07);     /* GP13 -> ~GP17 */
d = Get_CFG(0xF1);                    /* get GPIO Port 1 data */
d = d & 0xF0;
if (d != 0x70 )
{
   printf("\nGP13 -> GP17 test fail !!!\n\n");
   Set_CFG(0xF0, 0xff);  /* GPIO Port 1 is input */
   exit(1);
}
/* IO test loop 2 */
/* Set GPIO Port 1 Enable */
Set_CFG(0x07, 0x07);     /* Select logic device 07*/
Set_CFG(0x30, 0x01);     /* Enable GPIO Port 1 */
Set_CFG(0xF0, 0x0F);     /* GPIO Port 1 B7-4 is output, B3-0 is input */
```

```
Set_CFG(0x07, 0x07);     /* Select logic device 07*/
Set_CFG(0xF1, 0xe0);     /* GP14 -> ~GP10 */
d = Get_CFG(0xF1);                    /* get GPIO Port 1 data */
d = d & 0x0F;
if (d != 0x0e )
{
   printf("\nGP14 -> GP10 test fail !!!\n\n");
   Set_CFG(0xF0, 0xff);  /* GPIO Port 1 is input */
   exit(1);
}

Set_CFG(0x07, 0x07);     /* Select logic device 07*/
Set_CFG(0xF1, 0xd0);     /* GP15 -> ~GP11 */
d = Get_CFG(0xF1);                    /* get GPIO Port 1 data */
d = d & 0x0F;
if (d != 0x0d )
{
   printf("\nGP15 -> GP11 test fail !!!\n\n");
   Set_CFG(0xF0, 0xff);  /* GPIO Port 1 is input */
   exit(1);
}
Set_CFG(0x07, 0x07);     /* Select logic device 07*/
Set_CFG(0xF1, 0xb0);     /* GP16 -> ~GP12 */
d = Get_CFG(0xF1);                    /* get GPIO Port 1 data */
d = d & 0x0F;
if (d != 0x0b )
{
   printf("\nGP16 -> GP12 test fail !!!\n\n");
   Set_CFG(0xF0, 0xff);  /* GPIO Port 1 is input */
   exit(1);
}
Set_CFG(0x07, 0x07);     /* Select logic device 07*/
Set_CFG(0xF1, 0x70);     /* GP17 -> ~GP13 */
d = Get_CFG(0xF1);                    /* get GPIO Port 1 data */
d = d & 0x0F;
if (d != 0x07 )
{
   printf("\nGP17 -> GP13 test fail !!!\n\n");
   Set_CFG(0xF0, 0xff);  /* GPIO Port 1 is input */
   exit(1);
}
```

```
        Set_CFG(0xF0, 0xff);      /* GPIO Port 1 is input */
        printf("\nGPIO TEST PASS !\n\n");
        return(0);
    }
```

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Chapter 4
BIOS Setup Information

96M4321o is equipped with the AWARD BIOS stored in Flash ROM. This BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, 96M4321o communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start-up.

4.1 Entering Setup

Turn on or reboot the computer. When the message "Hit <DEL> if you want to run SETUP" appears, press <Del> key immediately to enter BIOS setup program.

If the message disappears before you respond, but you still wish to enter Setup, please restart the system to try "COLD START" again by turning it OFF and then ON, or touch the "RESET" button. You may also restart from "WARM START" by pressing <Ctrl>, <Alt>, and <Delete> keys simultaneously. If you do not press the keys at the right time and the system will not boot, an error message will be displayed and you will again be asked to,

Press <F1> to Run SETUP or Resume

In HIFLEX BIOS setup, you can use the keyboard to choose among options or modify the system parameters to match the options with your system. The table below will show you all of keystroke functions in BIOS setup.

General Help	
↑ ↓ → ←	: Move
Enter	: Select
+ / - /PU /PD	: Value
ESC	: Exit
F1	: General Help
F2	: Item Help
F5	: Previous Values
F6	: Fail-Safe Defaults
F7	: Optimized Defaults
F9	: Menu in BIOS
F10	: Save

4.2 Main Menu

Once you enter 96M4321o series AWARD BIOS CMOS Setup Utility, a Main Menu is presented. The Main Menu allows user to select from eleven setup functions and two exit choices. Use arrow keys to switch among items and press <Enter> key to accept or bring up the sub-menu.

Phoenix- AwardBIOS CMOS Setup Utility

▶ Standard CMOS Features ▶ Advanced BIOS Features ▶ Advanced Chipset Features ▶ Integrated Peripherals ▶ Power Management Setup ▶ PnP/PCI Configurations ▶ PC Health Status	▶ Frequency/Voltage Control Load Fail-Safe Defaults Load Optimized Defaults Set Supervisor Password Set User Password Save & Exit Setup Exit Without Saving
ESC : Quit F9 : Menu in BIOS ↑↓→← : Select Item F10 : Save & Exit Setup	
Time, Date, Hard Disk Type …	

Note:
It is strongly recommended to reload Optimal Setting if CMOS is lost or BIOS is updated.

4.3 Standard CMOS Setup Menu

This setup page includes all the items in standard compatible BIOS. Use the arrow keys to highlight the item and then use the <PgUp>/<PgDn> or <+>/<-> keys to select the value or number you want in each item and press <Enter> key to certify it.

Follow command keys in CMOS Setup table to change **Date**, **Time**, **Drive type**, and **Boot Sector Virus Protection Status**.

Phoenix- AwardBIOS CMOS Setup Utility
Standard CMOS Features

Date (mm:dd:yy)	Mon, May 1 2007	Item Help
Time (hh:mm:ss)	10 : 20 : 30	
		Menu Level ▶
▶ IDE Channel 0 Master	[None]	
▶ IDE Channel 0 Slave	[None]	Change the day, month, year and century
▶ IDE Channel 1 Master	[None]	
▶ IDE Channel 1 Slave	[None]	
▶ IDE Channel 2 Master	[None]	
▶ IDE Channel 3 Master	[None]	
▶ IDE Channel 4 Master	[None]	
▶ IDE Channel 4 Slave	[None]	
Drive A	[1.4M, 3.5 in.]	
Drive B	[None]	
Video	[EVG/VGA]	
Halt On	[All, But Keyboard]	
Base Memory	640K	
Extended Memory	252928K	
Total Memory	253952K	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

■ **Menu Selections**

Item	Options	Description
Date	mm:dd:yy	Change the day, month, year and century
Time	hh:mm:ss	Change the internal clock
IDE Channel 0 Master	Options are in its sub menu (described in Table of section 4.4)	Press <Enter> to enter the sub menu of detailed options
IDE Channel 0 Slave		
IDE Channel 1 Master		
IDE Channel 1 Slave		
IDE Channel 2 Master		
IDE Channel 3 Master		
IDE Channel 4 Master		
IDE Channel 4 Slave		
Video	EGA/VGA CGA 40 CGA 80 MONO	Select the default video device
Halt On	All Errors No Errors All, but Keyboard	Select the situation in which you want the BIOS to stop the POST process and notify you
Base Memory	640K	Displays the amount of conventional memory detected during boot up
Extended Memory	N/A	Displays the amount of extended memory detected during boot up
Total Memory	N/A	Displays the total memory available in the system

Note:
★ is indicating default setting.

4.4 IDE Adaptors Setup Menu

The IDE adapters control the IDE devices, such as hard disk drive or CD-ROM drive. It uses a separate sub menu to configure each hard disk drive (Master and Slave).

Phoenix- AwardBIOS CMOS Setup Utility
IDE Channel 0/1/2/3/4 Master & Slave

IDE HDD Auto-Detection	Press Enter	Item Help
IDE Channel 0 Master	[Auto]	
Access Mode	[Auto]	Menu Level ▶
Capacity	0 MB	To atuo-detect the HDD's size, head … on this channel
Cylinder	0	
Head	0	
Precomp	0	
Landing Zone	0	
Sector	0	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

■ **Menu Selections**

Item	Options	Description
IDE HDD Auto-detection	Press Enter	Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.
IDE Channel 0 /1/2/3/4 Master (& Slave)	None Auto Manual	Selecting 'manual' lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE !
Access Mode	CHS, LBA Large, Auto	Choose the access mode for this hard disk
Capacity	Auto Display your disk drive size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk checking program.
The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'		
Cylinder	Min=0, Max=65535	Set the number of cylinders for hard disk
Head	Min=0, Max=255	Set the number of read/write heads
Precomp	Min=0, Max=65535	**** Warning: Setting a value of 65535 means no hard disk
Landing zone	Min=0, Max=65535	****
Sector	Min=0, Max=255	Number of sectors per track

4.5 Advanced BIOS Features

This section allows user to configure your system for basic operation. The system's default speed, boot-up sequence, keyboard operation, shadowing and security may be modified accordingly.

Phoenix- AwardBIOS CMOS Setup Utility
Advanced BIOS Features

▶ CPU Feature	[Press Enter]	Item Help
▶ Hard Disk Boot Priority	[Press Enter]	
Virus Warning	[Disabled]	Menu Level ▶
CPU L1 & L2 Cache	[Enabled]	
CPU L3 Cache	[Enabled]	Select Hard Disk Boot Device Priority
Quick Power On Self Test	[Enabled]	
First Boot Device	[Floppy]	
Second Boot Device	[CDROM]	
Third Boot Device	[Hard Disk]	
Boot Other Device	[Enabled]	
Swap Floppy Drive	[Disabled]	
Boot up Floppy Seek	[Enabled]	
Boot up NumLock Status	[On]	
Gate A20 Option	[Fast]	
Typematic Rate Setting	[Disabled]	
X Typematic Rate (Chars/Sec)	6	
X Typematic Delay (Msec)	250	
Security Option	[Setup]	
APIC Mode	[Enabled]	
MPS Version Control For OS	[1.4]	
OS Select For DRAM > 64MB	[Non-OS2]	
X Console Redirection	Disabled	
X Baud Rate	19200	
Agent after boot	Enabled	
Report No FDD For WIN 95	[No]	
Small Logo(EPA) Show	[Disabled]	
ASF support	[Enabled]	
DMI Event Log	[Enabled]	
Clear All DMI Event Log	[Yes]	
View DMI Event Log	[Enter]	
Mark DMI Event as Read	[Enter]	
Event Log Capacity	Space Available	
Event Log Validity	Valid	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Phoenix- AwardBIOS CMOS Setup Utility
CPU Feature

Limit CPUID MaxVal [Disabled] Execute Disabled Bit [Enabled] Virtualization Technology [Enabled]	Item Help Menu Level ▶ Set Limit CPUID MaxVa to 3, Should Be "Disabled" for WinXP
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults	

Limit CPUID MaxVal

The choice: Enabled, Disabled.

Set Limit CPUID MaxVAL to 3, Should Be "Disabled" for WinXP.

Execute Disabled Bit

The choice: Enabled, Disabled.

When disabled, forces the XD feature flag to always return.

Virtualization Technology

The choice: Enabled, Disabled.

When enabled, a VMM can utilize the addition hardware re-capabilities provided by vanderpool technology.

Phoenix- AwardBIOS CMOS Setup Utility
Hard Disk Boot Priority

1. *ch0 M. : Hard Disk module name* 2. Bootable add-in Cards	Item Help Menu Level ▶ Use < ↑ > or < ↓ > to select a device, then press <+> to move it up, or <-> to move it down the list. Press <ESC> to exit this menu.
↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults	

Note:
The oblique word is indicating to appear HDD device message, which user employs.

Hard Disk Boot Priority

Select Hard Disk Boot Device Priority. Use < ↑ > or < ↓ > to select a device, then press <+> to move it up, or <-> to move it down the list. Press <ESC> to exit this menu.

Bootable Add-in Cards	Select SCSI Boot
Ch x M (S).	Select IDE Channel 0,1 Master or Salve Boot
Ch x M.	Select IDE Channel 2, 3 or 4 Master Boot

Virus Warning

Allow you to choose the VIRUS warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep.

Enabled	Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when anything attempts to access the boot sector or hard disk partition table.

CPU L1 Cache/L2 Cache/L3 Cache

These two categories speed up memory access. However, it depends on CPU/chipset design.

Enabled	Enable cache
Disabled	Disable cache

Quick Power On Self Test

Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.

Enabled	Enable quick POST
Disabled	Normal POST

First/Second/Third Boot Device

Select your Boot Device Priority.

The choice: Floppy, LS120, Hard Disk, CDROM, ZIP 100, USB-FDD, USB-ZIP, USB-CDROM, LAN and Disabled.

Boot Other Device

Select your Boot Device Priority.

The choice: Enabled, Disabled.

Swap Floppy Drive

If the system has two floppy drives, choose enable to assign physical driver B to logical drive A and Vice-Versa.

The choice: Enabled, Disabled.

Boot Up Floppy Seek

Enabled tests floppy drives to determine whether they have 40 or 80 tracks.

The choice: Enabled, Disabled.

Boot Up NumLock Status

Select power on state for NumLock.

The choice: Off, On.

Gate A20 Option

Fast-lets chipsets control Gate A20 and Normal – a pin in the keyboard controller controls Gate A20. Default is Fast.

The choice: Normal, Fast.

Typematic Rate Setting

Keystrokes repeat at rate determined by the keyboard controller – when enable, the typematic rate and typematic delay can be selected.

The choice: Enabled, Disabled

Security Option

Select whether the password is required every time the system boots or only when you enter setup.

System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

Note:
To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.

APIC Mode

The choice: Enabled, Disabled.

MPS Version Control For OS

The choice: 1.1, 1.4

OS Select For DRAM > 64MB

Select OS/2 only if you are running SO/2 operating system with greater than 64MB of RAM on the system.

The choice: Non-OS2, OS2.

Report No FDD for WIN 95

The choice: No, Yes.

Small Logo (EPA) Show

The choice: Enabled, Disabled.

ASF support

The choice: Enabled, Disabled.

DMI Event Log

[Enabled]; store POST error message to the DMI Event Log. [Disabled]; Don't store POST error message to the DMI Event Log.

The choice: Enabled, Disabled.

Clear All DMI Event Log

When this item is selected to [Yes], the DMI event log will be cleared at next POST stage, and then set this item to [No] automatic.

The choice: Enabled, Disabled.

View DMI Event Log

Press [Enter] to show all DMI event log.

Mark DMI Event as Read

Clear all DMI event logs immediately. Press [Enter] will pop up a confirm screen. Hit [Y] and [enter], then clear all DMI event logs right now.

4.6 Advanced Chipset Features

This section allows user to configure the system based on the specific features of the Intel® Q965 chipset for 96M4321o. This chipset manages bus speeds and access to system memory resources, such as DRAM (DDR2 SDRAM) and the external cache. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for the system. The only time user might consider making any changes would be if you discovered that data was being lost while during system operation.

Phoenix- AwardBIOS CMOS Setup Utility
Advanced Chipset Features

System BIOS Cacheable	[Enabled]	Item Help
Memory Hole At 15M-16M	[Disabled]	
▶ PCI Express Root Port Func	[Press Enter]	Menu Level ▶
▶ Advanced Fan Speed Control	[Press Enter]	
AMT BIOS Support	[Enabled]	
GbE LAN	[Enabled]	
SOL Support	Enabled	
IDE-R Support	Enabled	
Platform Mng Selection	Intel AMT	
** VGA Setting **		
PEG/Onchip VGA Control	[onchip VGA]	
On-Chip Frame Buffer Size	[8MB]	
DVMT Mode	[DVMT]	
DVMT/FIXED Memory Size	[128MB]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

The choice: Enabled, Disabled.

Memory Hole At 15-16M

In order to improve performance, certain space in memory is reserved for ISA cards. This memory must be mapped into the memory space below 16MB.
The choice: Enabled, Disabled.

Phoenix- AwardBIOS CMOS Setup Utility
PCI Express Root Port Func

PCI Express Port 1	[Auto]	Item Help
PCI Express Port 2	[Auto]	
PCI Express Port 3	[Auto]	Menu Level ▶
PCI Express Port 4	[Auto]	
PCI Express Port 5	[Auto]	
PCI Express Port 6	[Auto]	
PCI-E Compliancy Mode	[v1.0a]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

PCI Express Port 1/2/3/4/5/6

The choice: Auto, Enabled, Disabled.

PCI-X Compliant Mode

The choice: v1.0a, v1.0.

Phoenix- AwardBIOS CMOS Setup Utility
Advanced Fan Speed Control

Fan1 Speed Monitor	[Enabled]	Item Help
Fan2 Speed Monitor	[Enabled]	
Fan3 Speed Monitor	[Enabled]	Menu Level ▶

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

AMT BIOS support

96M4321o supports AMT (active management technology) function, when user sets this function “Enabled”, user shall follow up the procedure which must press <Ctrl> and “P” simultaneously to enter AMI program screen.

The choice: Enabled, Disabled.

GbE LAN

Giga Ethernet function is available or not.

The choice: Enabled, Disabled.

PEG/OnChip VGA Control

The choice: Onchip VGA, PEG Port, Auto.

On-Chip Frame Buffer Size

Users can set the display memory size that shared from main memory.

The choice: 1MB, 8MB.

DVMT Mode

The choice: FIXED, DVMT.

DVMT/FIXED Memory Size

The choice: 128MB, 256MB.

4.7 Integrated Peripherals

Phoenix- AwardBIOS CMOS Setup Utility
Integrated Peripherals

▶ OnChip IDE Device	[Press Enter]	Item Help
▶ Onboard Device	[Press Enter]	
CPU Relative Temperature	℃	Menu Level ▶
Current FAN1 Speed	RPM	
Current FAN2 Speed	RPM	
▶ Super IO Device	[Press Enter]	
Watch Dog Timer Select	[Disabled]	
▶ USB Device Setting	[Press Enter]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Phoenix- AwardBIOS CMOS Setup Utility
OnChip IDE Device

IDE HDD Block Mode	[Enabled]	Item Help
IDE DMA transfer access	[Enabled]	
IDE Primary Master PIO	[Auto]	Menu Level ▶
IDE Primary Slave PIO	[Auto]	
IDE Primary Master UDMA	[Auto]	If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.
IDE Primary Slave UDMA	[Auto]	
On-Chip Secondary PCI IDE	[Enabled]	
IDE Secondary Master PIO	[Auto]	
IDE Secondary Slave PIO	[Auto]	
IDE Secondary Master UDMA	[Auto]	
IDE Secondary Slave UDMA	[Auto]	
SATA Mode	[IDE]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

IDE HDD Block Mode

If IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

The choice: Enabled, Disabled.

IDE DMA transfer access

The choice: Enabled, Disabled.

On-Chip Secondary PCI IDE

The chipset contains a PCI IDE interface with support for two IDE channels. Select Enabled to activate the primary IDE interface. Select Disabled to deactivate this interface.

The choice: Enabled, Disabled.

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields allow set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33/66/100 implementation is possible only if IDE hard drive supports and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and system software both support Ultra DMA/33/66/100, select Auto to enable BIOS support.

The choice: Auto, Disabled.

SATA Mode

The choice: IDE, RAID, AHCI.

Onboard DEVICE

82573L Lan Control setting.

The choice: Enabled, Disabled.

Phoenix- AwardBIOS CMOS Setup Utility
Super IO Device

Onboard FDC Controller	[Enabled]	Item Help
Onboard Serial Port 1	[3F8/IRQ4]	
Onboard Serial Port 2	[2F8/IRQ3]	Menu Level ►
UART Mode Select	[Normal]	
X RxD, TxD Active	Hi, Lo	
X IR Transmission Delay	Enabled	
X UR2 Duplex Mode	Half	
X Use IR Pins	IR-Rx2Tx2	
Onboard Parallel Port	[378/IRQ7]	
Parallel Port Mode	[SPP]	
X EPP Mode Select	EPP1.7	
X ECP Mode Use DMA	3	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Onboard FDC Controller

This item allows enable/disable onboard Floppy disk controller.

The choice: Enabled, Disabled.

Onboard Serial Port 1/Port 2

Select an DDR2 and corresponding interrupt for the first and second serial ports.

The choice: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

UART Mode Select

This item allows users to select Infrared transmission mode.

Normal	Disable Infrared function
ASKIR	Select ASKIR mode transmission

As Infrared transmission function shares onboard serial port 2, COM2 needs to be enabled.

RxD, TxD Active

This item is to configure Infrared transmission rate. Four options are available :

Hi, Hi	High rate for receiving / High rate for transmitting
Hi, Lo	High rate for receiving / Low rate for transmitting
Lo, Hi	Low rate for receiving / High rate for transmitting
Lo, Lo	Low rate for receiving / Low rate for transmitting

IR Transmission Delay

This option will be available when IR is enabled.

The choice: Enabled, Disabled.

UR2 Duplex Mode

The available choices are full duplex mode and half duplex mode.

The choice: Full, Half.

Use IR Pins

The choice: IR-Rx2Tx2 / RxD2, TxD2. (Default IR-Rx2Tx2)

Onboard Parallel Port

This item allows you to configuring I/O DDR2 of the onboard parallel port.

The choice: Disabled, 378/IRQ7, 278/IRQ5, 3BC/IRQ7.

Parallel Port Mode

There are four different modes for the onboard parallel port :

SPP	Switch to SPP mode
EPP	Switch to EPP mode
ECP	Switch to ECP mode
ECP + EPP	Switch to ECP + EPP mode

EPP Mode Select

Select different version of EPP mode.

The choice: EPP1.7, EPP1.9. (Default EPP1.7)

ECP Mode Use DMA

Select a proper DMA channel for ECP mode.

The choice: 3, 1. (Default 3)

Watch Dog Timer Select

The Choice: Disabled, 10, 20, 30, 40 sec, & 1, 2, 3, 4 Min.

Phoenix- AwardBIOS CMOS Setup Utility
USB Device Setting

USB 1.0 Controller	[Enabled]	Item Help
USB 2.0 Controller	[Enabled]	
USB Operation Mode	[High Speed]	Menu Level ▶
USB Keyboard Function	[Enabled]	
USB Mouse Function	[Enabled]	
USB Storage Function	[Enabled]	
*** USB Mass Storage Device Boot Setting ***		

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

USB 1.0/2.0 Controller

This entry is for disable/enable EHCI controller only. This BIOS itself may/may not have high speed USB support built in, the support will be automatically turn on when high speed device were attached.

The choice: Enabled, Disabled.

USB Operation Mode

Auto decide USB device operation mode. [High speed]: if USB device was high speed device, then it operated.

USB Keyboard Function

This item allows enabling USB keyboard function under POST, BIOS setup menu, DOS, or Windows-NT with no USB driver loaded.

The choice: Enabled, Disabled.

USB Mouse Function

[Enabled] or [Disabled] legacy support of USB Mouse.

The choice: Enabled, Disabled.

USB Storage Function

[Enabled] or [Disabled] legacy support of USB Mass storage.

The choice: Enabled, Disabled.

4.8 Power Management Setup

The Power Management Setup allows configuration of the system to most effectively save energy while operating in a manner consistent with your own style of computer use.

Phoenix- AwardBIOS CMOS Setup Utility
Power Management Setup

	ACPI Function	[Enabled]
	ACPI Suspend Type	[S3(STR)]
	Run VGABIOS if S3 Resume	[Auto]
	Power Management	[User Define]
	Video Off Method	[DPMS]
	Video Off In Suspend	[Yes]
	Suspend Type	[Stop Grant]
	Mode Use IRQ	[3]
	Suspend Mode	[Disabled]
	HDD Power Down	[Disabled]
	Soft-Off by PWR-BTTN	[Instant-Off]
	Wake-Up by PCI card	[Enabled]
	Power On by Ring	[Ensabled]
	USB KB Wake-Up From S3	[Disabled]
	Resume by Alarm	[Disabled]
X	Date(of Month) Alarm	0
X	Time(hh:mm:ss) Alarm	0 : 0 :0
	** Reload Global Timer Events **	
	Primary IDE 0	[Disabled]
	Primary IDE 1	[Disabled]
	Secondary IDE 0	[Disabled]
	Secondary IDE 1	[Disabled]
	FDD,COM,LPT Port	[Disabled]
	PCI PIRQ[A-D]#	[Disabled]
	PWRON After PWR-Fail	[Off]

Item Help

Menu Level ▶

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

ACPI Function

This item allows you to enable/disable the Advanced Configuration and Power Management (ACPI).

The choice: Enabled, Disabled.

ACPI Suspend Type

To decide which ACPI suspend mode to use.

The choice: S1(POS), S3(STR).

Run VGA BIOS if S3 Resume

The choice: Auto, Yes, No.

Power Management

This category allows selecting the type (or degree) of power saving and is directly related to "HDD Power Down", "Suspend Mode".

There are three selections for Power Management, three of which have fixed mode settings.

Min. Power Saving	Minimum power management. Suspend Mode = 1 Hour, and HDD Power Down = 15 Min.
Max. Power Saving	Maximum power management. Suspend Mode = 1 Min., and HDD Power Down = 1 Min.
User Defined	Allows you to set each mode individually. When not disabled, Suspend Mode ranges from 1 min. to 1 Hour and HDD Power Down ranges from 1 Min. to 15 Min.

Video Off Method

This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Initial display power management signaling.

Video Off In Suspend

This allows user to enable/disable video off in Suspend Mode.

The choice: Yes, No.

Suspend Type

Two options are available : Stop Grant and PwrOn Suspend.

The choice: Stop Grant, PwrOn Suspend.

Suspend Mode

When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.

The choice: Disabled, 1 Min, 2 Min, 4 Min, 8 Min, 12 Min, 20 Min, 30 Min, 40 Min, 1 Hour.

MODEM Use IRQ

The choice: NA, 3, 4, 5, 7, 9, 10, 11.

HDD Power Down

When enabled and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

The choice: Disabled, 1 Min, 2 Min, 3 Min, 4 Min, 5 Min, 6 Min, 7 Min, 8 Min, 9 Min, 10 Min, 11 Min, 12 Min, 13 Min, 14 Min, 15 Min.

Soft-Off by PWR-BTTN

This item allows users to set the time to remove the power after the power button is pressed.

The choice: Instant-Off, Delay 4 Sec.

Wake-Up By PCI card

This option can be enabled to support Wake Up by PCI card.

The choice: Disabled, Enabled.

Power On by Ring

When select the default “Enabled”, a system that is at soft-off mode will be alert to Wake-On-Modem or Wake-On LAN.

The choice: Enabled, Disabled.

USB KB Wake-Up From S3

The choice: Enabled, Disabled.

Resume by Alarm

This item allows users to enable/disable the resume by alarm function. When "Enabled" is selected, system using ATX power supply could be powered on if a customized time and day is approached.

The choice: Enabled, Disabled.

Date(of Month) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the date parameter of the timing dateline on which to power on the system.

The choice: 0 ~ 31.

Time(hh:mm:ss) Alarm

When "Resume by Alarm" is enabled, this item could allow users to configure the time parameter of the timing dateline on which to power on the system.

The choice: hh (0~23), mm (0~59), ss (0 ~59).

Primary/Secondary IDE 0/1

This item is to configure IDE devices being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

FDD, COM, LPT Port

This item is to configure floppy device, COM ports, and parallel port being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

PCI PIRQ[A-D]#

This option can be used to detect PCI device activities. If they are activities, the system will go into sleep mode.

The choice: Enabled, Disabled.

PWRON After PWR-Fail

This item allows user to configure the power status of using ATX power supply after a serious power loss occurs.

On	System automatically restores Power back
Off	System stays at Power-Off
Former-Str	

4.9 PnP/PCI Configurations

This section describes configuring the PCI bus system. PCI, or **P**eripheral **C**omponent **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components.

This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

Phoenix- AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

Init Display First	[PCI Slot]	Item Help
Reset Configuration Data	[Disabled]	
Resources Controlled By	[Auto(ESCD)]	Menu Level ▶
X IRQ Resources	Press Enter	
PCI/VGA Palette Snoop	[Disabled]	
*** PCI Express relative items ***		
Maximum Payload Size	[128]	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Init Display First

The choice: PCI Slot, Onboard.

Reset Configuration Data

Default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot.

The choice: Enabled, Disabled.

Resource Controlled By

BIOS can automatically configure the entire boot and plug and play compatible devices. If set to Auto, IRQ DMA and memory base DDR2 fields can not be selected, since BIOS automatically assigns them.

The choice: Auto (ESCD), Manual.

Watch Out! When user selects "Manual", the shadow segments of "IRQ Resource" and "DMA resource" will be able to available.

IRQ Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.

The choice: Press Enter. (Default setting is unavailable selection)
IRQ-3/IRQ-4/IRQ-5/IRQ-7/IRQ-9/IRQ-10/IRQ-11/IRQ-12/IRQ-14/IRQ-15 assigned to.

The choice: PCI/ISA PnP, Legacy ISA.

PCI/VGA Palette Snoop

Legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PnP for devices compliant with the plug and play standard whether designed for PCI or ISA bus architecture.

The choice: Enabled, Disabled.

Maximum Payload Size

Set maximum TLP payload size for the PCI Express devices; the unit is byte.
The choice: 128.

4.10 PC Health Status

Phoenix- AwardBIOS CMOS Setup Utility
PC Health Status

Shutdown Temperature	Disabled	Item Help
CPU Warning Temperature	[Disabled]	
Current System Temp	39℃/102℉	Menu Level ▶
Vcore	1.28 V	
+12 V	12.99 V	
+5 V	5.26 V	
+1.8 V	1.77 V	
-1.25 V	1.23 V	
VCC (V)	5.40 V	
VBT (V)	3.20 V	
5VSB(V)	5.40 V	

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

4.11 Frequency/Voltage Control

Phoenix- AwardBIOS CMOS Setup Utility
Frequency / Voltage Control

Auto Detect DIMM/PCI Clk	[Enabled]	Item Help
Spread Spectrum	[Disabled]	
CPU Host/SRC/PCI Clock	[Default]	Menu Level ▶

↑↓→←: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Auto Detect DIMM/PCI Clk

The choice: Enabled, Disabled.

Spread Spectrum

This item allows user to enable/disable the spread spectrum modulate.

The choice: Enabled, Disabled.

COU Host/SRC/PCI Clock

The choice: Default.

4.12 Default Menu

Selecting "Defaults" from the main menu shows two options which are described below,

Load Fail-Safe Defaults

When <Enter> is pressed, a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N) ? N

Pressing 'Y' loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When <Enter> is pressed, a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N) ? N

Pressing 'Y' loads the default values that are factory settings for optimal performance system operations.

4.13 Supervisor/User Password Setting

Either supervisor or user password can be setup, or both of then. The differences between are:

Set Supervisor Password : can enter and change the options of the setup menus.

Set User Password : just can only enter but do not have the right to change the options of the setup menus. When selecting this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will reboot and Setup can be entered freely.

PASSWORD DISABLED

When a password has been enabled, user will be prompted to enter it every time user tries to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of the computer.

User may determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

4.14 Exiting Selection

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS – a special section of memory that stays on after system off. During subsequnet booting of computer, the BIOS configures the system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit Without Saving (Y/N)? N

This allows user to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

Chapter 5
Troubleshooting

This chapter provides a few useful tips to quickly get 96M4321o running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

5.1 Hardware Quick Installation

Backplane

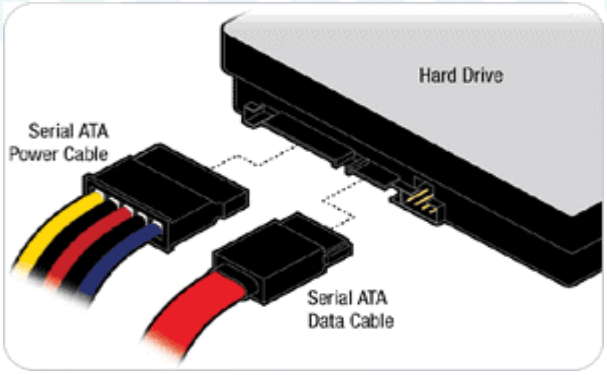
96M4321o is a full-sized Signal Board Computer, and therefore is only able to run on PICMG 1.3 backplane. To know whether your backplane is PICMG 1.3 backplane, please contact with vendor or manufacturer.

P4 Power connector

The CPU supplementary Power Connector (J10) has to be connected to a system all the time no matter using ATX mode. Otherwise, the system won't boot up properly.

Serial ATA Hard Disk employment

Each Serial ATA channel can only connect to one SATA hard disk at a time; there are total four connectors, J27/J28/J31/J32. The installation of Serial ATA is simpler and easier than IDE, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation. All you need to do is to plug in two cables and enable SATA in System BIOS.



5.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. CPU, CPU Fan, 240-pin DDR2 SDRAM, keyboard, mouse, floppy drive, IDE hard disk, printer, VGA connector, device cables, ATX accessories or 12V 4-pin power cable are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with 96M4321o series, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to "**Load Optimal Defaults**", press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

Auto Detect Hard Disks

In the BIOS => Standard CMOS setup menu, pick up any one from Primary/Secondary Master/Slave IDE ports, and press "Enter". Setup the selected IDE port and its access mode to "Auto". This will force system to automatically pick up the IDE devices that are being connected each time system boots up.

Improper disable operation

There are too many occasions where users disable a certain device/feature in one application through BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the floppy drive, COM1/COM2 ports, Parallel port, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource. A few good examples are

Disable COM1 serial port to release IRQ #4
Disable COM2 serial port to release IRQ #3
Disable Parallel port to release IRQ #7
Disable PS/2 mouse to release IRQ #12,
Etc…

A quick review of the basic IRQ mapping is given below for your reference.

IRQ#	Description
IRQ #0	System Timer
IRQ #1	Keyboard Event
IRQ #2	Usable IRQ
IRQ #3	COM2
IRQ #4	COM1
IRQ #5	Usable IRQ
IRQ #6	Diskette Event
IRQ #7	Usable IRQ
IRQ #8	Real-Time Clock
IRQ #9	Usable IRQ
IRQ #10	Usable IRQ
IRQ #11	Usable IRQ
IRQ #12	IBM Mouse Event
IRQ #13	Coprocessor Error
IRQ #14	Hard Disk Event
IRQ #15	Usable IRQ

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release further IRQ numbers.

5.3 FAQ

Unboot problem

Symptom: SBC keeps beeping, and no screen has shown.

Solution: In fact, each beep sound represents different definition of error message. Please refer to table as following:

Beep sounds	Meaning	Action
One long beep with one short beeps	DRAM error	Change DRAM or reinstall it
One long beep constantly	DRAM error	Change DRAM or reinstall it
One long beep with two short beeps	Monitor or Display Card error	Please check Monitor connector whether it inserts properly
Beep rapidly	Power error warning	Please check Power mode setting

Symptom:There is neither no beeps nor screen output.

Solution: Indeed, you can do the stand-alone to identify the root cause by isolating the board from other possible system devices such as PCI device, backplane, and so on. If the system still cannot boot up, please fill out RMA from which is provides on Portwell website, and then send back to Portwell as a RMA. Besides, you also visit RMA site (http://www.portwell.com.tw/rma/login.asp) to check RMA report if necessary.

Information & Support

Question:Intel Q965 Chipset supports Dual Channel Mode, but how can I enable this function?

Answer: Indeed, you don't have to change any setting. You can simply plug DDR2 SDRAM Module on DIMMs, and then system will automatically enable Dual Channel Mode.

Question:What kind of CPU supports Hyper-Threading?

Answer: All FSB 1066/800/533 MHz series CPU support Hyper-Threading mode.

Question:Why cannot I install USB 2.0 driver?

Answer: If you are using Windows 2000, you need to update your Service-Pack version to Service-Pack 4. If you are using Windows XP, you need to update Service-Pack to Service Pack 1 at least.

To solve this problem, you can download BIOS from our website
http://www.DSM.AG

If you cannot find BIOS that you need, please contact with Technical Support Department to request a new BIOS to solve this problem.
Technical Support Department
Mailto: support@ DSM.AG

Question:I forget my password of system BIOS, what am I supposed to do?

Answer: You can simply short 2-3 pins on JP4 to clean your password.

Note:
Please visit our technical web site at
http://www.DSM.AG
For additional technical information is not covered in this manual.

System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used.

Memory Area	Size	Device Description
0000-003F	1K	Interrupt Area
0040-004F	0.3K	BIOS Data Area
0050-006F	0.5K	System Data
0700-0483	16K	DOS
0484-053F	2.9K	Program Area
0540-9EFE	614K	[Available]
9EFE-9EFE	0.1K	Unused
= Conventional memory ends at 640K =		
9F00-9FBF	3K	Extended BIOS Area
9FC0-9FFF	1K	Unused
A000-AFFF	64K	VGA Graphics
B000-B7FF	32K	Unused
B800-BFFF	32K	VGA Text
C000-CAFF	44K	Video ROM
CB00-CC49	5.2K	Unused
CC4A-CFFF	14K	High RAM
D000-DFFF	64K	Page Frame
E000-EEFF	60K	Unused
EF00-EFFF	4K	ROM
F000-FFFF	64K	System ROM
HMA	64K	First 64K Extended

Interrupt Request Lines (IRQ)

Peripheral devices can use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

IRQ#	Current Use	Default Use
IRQ 0	System ROM	System Timer
IRQ 1	System ROM	Keyboard Event
IRQ 2	Unassigned	Usable IRQ
IRQ 3	System ROM	COM2
IRQ 4	System ROM	COM1
IRQ 5	Unassigned	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	Unassigned	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	Unassigned	Usable IRQ
IRQ 10	Unassigned	Usable IRQ
IRQ 11	Unassigned	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	Unassigned	Usable IRQ